

ceiling is usually on the ground during such periods, but often lifting during the middle of the day. A change in pressure distribution producing moderate to fresh upper air winds is required before the fog or condensation is driven out of the interior valleys by air movement.

Visibility in the Pacific coast region may be said to vary with the seasons, if restricted visibility due to fog or storms is not considered. During the late spring, summer, and early autumn very little precipitation occurs over the entire area and upper air winds are usually light. Consequently the air over the area from the Rocky Mountains westward accumulates haze and forest-fire smoke during the season and is seldom washed out by rain or drifted away fast enough by air movement. If the season is unusually dry, forest fires are numerous and a smoky condition steadily increases as the season progresses. During the 1929 season, for example, visibility was reduced to one-fourth mile (0.4 kilometer) over Washington and Oregon, with smoke extending up to 10,000 feet (3,047 meters), resulting in suspension of much flying during a 2-weeks period in August of that year. A general rain over the district during such a period will clear the atmosphere and visibility will remain good for a week or 10 days following. Strong northerly winds at moderate and high elevations will

always clear the atmosphere and make visibility excellent for several days. During "north-wind days" pilots have many times reporting seeing Mount Rainier, near Seattle, Wash., and Mount Shasta, in northern California, while flying at high elevations over central Oregon.

At times of marked temperature inversion there is an optical phenomenon known as a mirage, which affects the earthward visibility for a pilot flying above the inversion surface. It is more pronounced during the summer period and near the coast where the inversion is greatest. From the air it may be so pronounced as to have the appearance of a layer of fog, except that directly below the plane, ground objects can be faintly seen. From a point near the level where inversion begins, the top of the cool moist layer has the appearance of a line on the horizon above which an apparent layer of exceptionally clear air about 1° wide prevails. This reflection phenomenon appears to the pilot during the daytime and disappears to him at night. Cities and airports not discernible at an angle from the plane during the day are readily seen under the same conditions at night and the false impression to the pilot is that smoke, haze, or fog has disappeared.

AVERAGE VISIBILITY AT CHICAGO AIRPORT

By F. H. WECK

The accompanying figure shows the daily march of horizontal visibility at the Chicago Airport for the first three months of 1930. The main contributing factor of reduced visibility is one of smoke. Contrary to the old adage, the darkest hour is not just before the dawn.

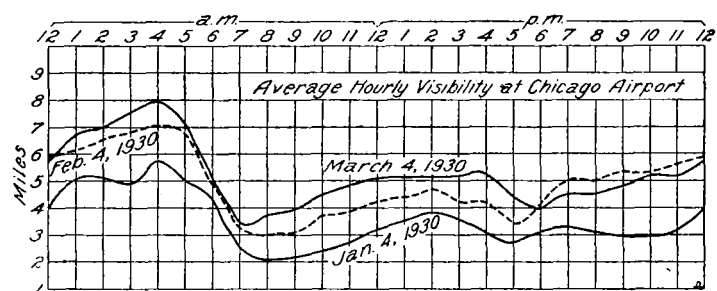


FIGURE 1.—Daily march of horizontal visibility, Chicago Airport, January, February, and March, 1930

Stoking furnaces in homes fills the air with smoke after the man of the house arises, and the visibility falls rapidly. As the day advances the smoke becomes lighter and the visibility improves. Then in the early morning

there is more haze and fog which disappear with the rise in temperature.

Firing in the afternoon at residences and banking furnaces at factories again reduce the visibility, after which it begins to rise. From the graph it appears that mail planes would have better flying conditions if they were scheduled to arrive in Chicago between 1 and 4 a. m. Most of them are due at from 5 to 8 a. m. and from 6 to 8 p. m.

As a further evidence that the visibility varies inversely as the amount of coal consumed, it is noted that from 6 p. m. till midnight the average visibility was less for March than for February. The mean temperature at 7 p. m. was 37.8° for February and 36.3° for March. Also the 7 a. m. mean temperature was 31.5° for February and 29° for March, but there was more fog during the month of February.

The average visibility for January was 3.6 miles, for February 4.8, and for March 5.2.

There is no scientific method used in obtaining values of visibilities. The ground around the airport is more or less level and a number of "visibility points" of known distance from the place of observation afford fairly reliable data.



FIGURE 1.—One of the three funnel clouds observed, photographed from Greensburg

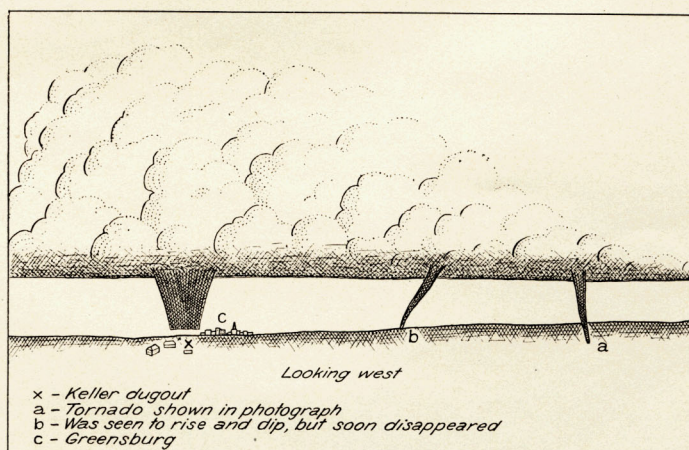


FIGURE 2.—Sketch of tornado funnel clouds from description by Mr. Keller. Looking west from his residence